ARTICLE XIII.

A CASE OF COLOUR-BLINDNESS FOR GREEN.

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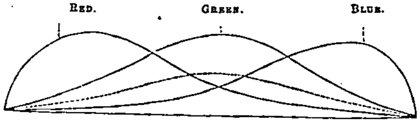
THE extreme infrequency of green-blindness, which is admitted by the followers of the Young-Helmholtz theory, and denied by Herring and his school as being inconsistent with their theory, is sufficient reason for bringing forward this case, which I saw last summer.

A. B., æt. 18, male, consulted me at the New York Eye and Ear Infirmary, saying that he was subject to the constant criticism of his employer concerning mistakes committed in selecting the different shades of *green* in sorting cigars, preparatory to packing in a large tobacco factory in this city. His vision was perfect, and the fundus was normal, but he was unable to select green from certain other colours, while blue and red were quickly and accurately recognized. Holmgren's colour-test was the first one used. He was given a light green skein (I), and told to select skeins of a corresponding colour. Greens, grays, drabs, dark yellows, and light browns were carefully collected and placed together. He was next given a rose-pink coloured skein (IIa), which was accurately matched with skeins of a like colour. And finally a bright red skein (IIb) was given, with which he correctly placed the reds. I now tried Daae's test-chart, which consists of a perforated card, on which are woven ten horizontal rows of coloured worsted, in blocks of three strands each, with seven blocks to the line. Eight out of the ten horizontal lines are made up of blocks of different colour. The remaining two represent, respectively, shades of *green*, from light to dark, and shades of *red* from light to dark. The patient, without hesitation pointed out the red line as containing blocks of the same colour.. The green line was passed over, and the line above, which contained greens, drabs, and light browns, was selected as being the only other on the card containing blocks of the same colour.

The result of these examinations is peculiar in that it shows the individual to have been colour-blind, without indicating the variety of colour-blindness, in a way that the tests are supposed to do. The patient was practically green-blind, however inconsistent that fact may be with theory; and to make the two harmonize, as also to explain such phenomena, the Young-Helmholtz theory is most satisfactory. If we recall the diagram used by Helmholtz to illustrate the colour curves, it will be seen that each one of his three primary colours (red, green, and blue) is perceived with a certain admixture of the other two—*i. e.*, a ray of light that gives to us the sensation of blue, acts powerfully upon the blue perceptive elements and to a lesser degree upon those for green and for red; and in a similar manner when *red* and *green* are perceived, the colour is not strictly a pure one, but is mixed with a small quantity of the other elementary colours. See diagram.



The unbroken lines indicate the curves showing the action of the spectral colours upon the three colour-perceptive elements; and the dotted line, the colour curve for green in the case here related.

In absolute colour-blindness for any one colour, green we will say, the retinal substance with which green is perceived is entirely absent, and the eye is then reduced to dichromatic vision; red and blue will be perceived, while other colours will be recognized as different shades of red and of blue respectively, in proportion to the preponderance of the one or the other colour. My case evidently does not come under this head, for blue and red were accurately recognized, and other colours were not confounded with them. Green and colours containing green had a colour peculiar to themselves, while the power of discriminating these colours one from another did not exist. The green perceptive elements in the retina were so far reduced that they could not be acted upon without setting up at the same time an undue action in the red and the blue perceptive elements which are in greater abundance than in the normal state; and thus a mixed sensation is excited, that furnishes the colour zone in which green and its derivatives are placed by the patient.

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